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ABSTRACT

A computer language that can be used by people of all ages, Logo allows children the freedom to direct their own learning. Integrating Logo into the curriculum provides students the opportunity to program a computer, to engage in logical, sequential thinking and planning, to solve problems, and to manipulate text, language, graphics, and music while engaging in creative project development. One of the most powerful outcomes is that students are able to analyze and develop their thinking and problem-solving skills as well develop specific debugging strategies. After hours of open-ended exploration, children will set specific goals and work very hard to achieve them, and the scenario is repeated at every grade level. Unfortunately, Logo can be abused. The imposition of a prescribed Logo curriculum for each grade imposes an order totally contrary to Papert's vision of heuristic learning and discovery, and slotting Logo into grades K-6 misses out on the fact that Logo is an exciting medium for exploring informal geometry in the middle school and deductive geometry in high school. Logo can also be used in undergraduate and graduate courses in education, for it has the potential to respond to the demand for problem-solving in the curriculum and for developing problem-solving skills throughout a child's school experience. (DJR)

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Where Does Logo Fit In?

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"Many children are held back in their learning because they have a model of learning in which you have either 'got it' or 'got it wrong'. But when you learn to program a computer you almost never get it right the first time. Learning to be a master programmer is learning to become highly skilled at isolating and correcting 'bugs', the parts that keep the program from working. The question to ask about the program is not whether it is right or wrong, but if it is fixable. If this way of looking at intellectual products were generalized to how the larger culture thinks about knowledge and its acquisition, we all might be less intimidated by our fears of being 'wrong'. This potential influence of the computer on changing our notion of a black and white version of our successes and failures is an example of using the computer as an 'object to think with'.

The passage cited above may be recognized as a quote of Seymour Papert from his book, Mindstorms. Upon examination of Papert's proposition, one may be surprised and somewhat disappointed to find no "hard and fast, emblazoned in bronze" answer to such a serious question. This question is demanding an answer from those of us who profess Logo as

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being good for kids (short, tall, heavy, thin, gifted, disabled, or average) and having a confined place in the curriculum.

For those who are not familiar with Logo, it can best be thought of as not only "an object to think with", but also as a computer language for children of <u>all</u> ages, one that is used by young children as well as graduate students. Papert compares Logo with English in that our language is the same one that is shared by those who are beginning to speak in babytalk as well as the language of philosophers and poets.

Papert sees Piaget as the theorist of learning without curriculum and the theorist of the kind of learning that happens without deliberate teaching. To turn him into the theorist of a new curriculum is to stand him on his head. Papert goes on to say, "teaching without curriculum" does not mean spontaneous, free-form classrooms or simply "leaving the child alone". It means supporting children as they build their own intellectual structures with materials drawn from the surrounding culture.

Not only is this a serious question, but it is a complex one as well. When one tries to solve this intricate puzzle, it is very difficult, if not impossible, to think solely of Logo. However, one must also examine curriculum and the teacher's role.

Effective strategies for realizing the potential promise of computer technology begin with the educator. An effective computer educator recognizes that computer technology creates a way of thinking which expands the capacity of the human mind to solve problems. The range of Logo problems to be solved is quite extensive. (The challenge of using only Cartesian coordinates for the graduate computer science major and the infamous box procedure for that first experience in procedure writing is an example of the range.) The effective educator also realizes that the computer is a tool for a problem-solving process, and it is not an end in itself. As we examine early Logo work of young children, we can see the beginning of this process. Most children who are caught up in "wrapping the 'turtle'" have set the goal of filling that screen. The educator must also recognize that computer education is a method for teaching problem-solving strategies of thought, and that computer education is an integral process of education, and it is not an isolated element (Norton, 1983).

Many educators and administrators have overcome the hardware and software acquisition problem but are still faced with the task of developing curricula which integrate the computer and take the fullest advantage of its potential as a teaching tool. Most educational leaders argue that computer education will only become effective when it is

integrated with the traditional school curriculum. Only those things that are integrated throughout one's total learning experience become a part of that person. The key for children is to understand what the computer can do and does do. If the computer is used routinely throughout a child's school experience, he or she will have that general understanding (Bonner, 1984).

Our whole approach toward the teaching of elementary mathematics should be through the concept of problem solving with wise use of the computer media. Educators can no longer afford to take five years to teach a child proficiency in two-digit division when a calculator or computer executes the algorithm in a fraction of a second. The world outside the classrooom is not too interested in the end product of a division algorithm, but rather in how this algorithm can be applied to solving problems. This is what we need to be teaching. In teaching all children to master problem solving strategies, we will go a long way toward enhancing their ability to learn (Taylor, 1990).

The notion of computer literacy grew up in the first place as an accident of history. It was due largely to the great speed with which computers have become important. Curriculum developers are 30, 40, or 50 years old. They grew up in a world without computers. Suddenly, they have had to face up to a shocking change in the very nature of the world around them. In inventing computer literacy

courses, they have designed a curriculum for themselves, and not a curriculum for the kids who have grown up with Pac-Man, automated bank tellers, and bar code readers in the supermarket (Harvey, 1983).

Logo, an object to think with, allows children freedom to direct their own learning. Integrating Logo into the curriculum provides students the opportunity to program a computer, to engage in logical, sequential thinking and planning, to solve problems, and to manipulate text, language, music, and graphics while engaging in creative project development. One of the most powerful outcomes of all is that the students are able to analyze their thinking and problem solving skills as well as develop specific debugging strategies.

Simple figures become the building blocks of more complex designs that have more sides and more angles. A successful finish is only a beginning for a new problem. "Now that I have done that, I wonder if I can do this?", the child ponders.

Logo group work is a way of sharing a problem within a group with each small group solving a child size part.

After many hours of open-ended exploration, children will set specific goals and work very hard to achieve them. Trucks, boats, planes, butterfiles, or trucks that started as butterflies and planes that began as boats are just a few examples. The scenario is repeated over and over at every

grade level. Geometry and symmetry are discovered and repeated.

Unfortunately, Logo has the potential to be abused. Publishers, textbook writers, and some teachers are now coming up with a prescribed Logo curriculum for each grade. This imposed order is totally contrary to Papert's vision of heuristic learning and discovery. This notion of prescribed learning skills would certainly make Seymour Papert turn over in his grave, even though he is still alive and well and back at MIT. Others are making the mistake of slotting Logo into grades K-6, missing out on the fact that Logo is a tremendously exciting medium for exploring informal geometry in the middle school and deductive geometry in the high school (Berger, 1984). When I am asked, "What can you do with Logo?", a smile comes across my face; for, I am quite certain that I will inevitably discover a new use working with this person. Logo has various interesting utilities such as the shape editor, music, and games. There are commercially prepared Logo programs available as well.

I, myself, have and continue to teach Logo to undergraduate and graduate students. The culminating project for these Logo classes is one that incorporates what they have been taught in terms of Logo content and can also serve as a teaching tool is some way. Story starters, graphic representations for stories, mathematics programs, social studies projects, art, and music are some project examples.

The exciting part for me is watching the students' faces as their procedures are executed. They may have watched it 1000 times, but time 1001, during sharing with their peers, fills them with pride.

The proposal for this article promised that a model for implementing the Logo computer language into the curriculum would be offered. A scope and sequence for Logo would suggest K-Logo, 1-Logo, 2-Logo, etc. We must respond to the demand for problem solving in the curriculum. Logo has the potential to meet this demand. My seven years of Logo work has taught me that unanswered Logo questions are not errors. They are simply new problems to solve. And, as long as we continue to ask questions, we will also continue to grow and learn.

REFERENCES

Bonner, P. (1984, September). Computers in education: Promise and reality. Personal Computing.

Harvey, B. (1983, May/June). Stop saying "computer literacy." Classroom Computer News.

Norton, P. (1983, October). Computer potentials and computer educators: A proactive view of computer education. Educational Technology.

Papert, S. (1980). Mindstorms: children, computers, and powerful ideas. New York: Basic Books, Inc.

Taylor, R. (1980). The computer in the school: Tutor, tool, tutee. New York: Teachers College Press.